



USER'S MANUAL

PCI Series Board

(Product Model: PCI-6103S)

32-Bit 1-Channel Timer/Counter PCI Product

Interval timer (1 µs to 16,777,215 µs)	Free-run counter (interval timer x 32-bit counter)	
1 channel		Low Profile PCI

■ Notes to Users

You should carefully read **Handle with Care** for your safety before using this product.

The specifications of the product are under continuous improvement and while every effort is made to keep this manual up-to-date, we reserve the right to update the contents of this **USER'S MANUAL** without prior notice.

Therefore, you should thoroughly read this **USER'S MANUAL** even if you have often purchased this product before.

All official specifications are expressed in metric. English unit is supplied for convenience. Using this product requires technical knowledge of hardware and software.

Conventions Used in This Manual



This mark means that there is a possibility of death or serious injury if you ignore or do not follow the said instructions.



This mark means that there is a possibility of injury or physical harm if you ignore or do not follow the said instructions.

	Prohibited Action	Stated action must be avoided.
	Don't Disassemble	Equipment must not be disassembled.
	Don't Touch	Equipment must not be touched with hands.
	Keep away from Static Electricity	Be careful of static electricity for the product damage.
	Note	Denotes a note.

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Document Description

Interface Corporation provides the following documents for this product. Please read carefully before using it.

Manual	Price	Description
User's Manual	Free of charge	<p>The user's manual including setup and hardware specifications describes the basic operation to install this product.</p> <ul style="list-style-type: none"> - Product installation - Device driver software installation - Product summary - Features - External interface specifications - Example connection of external equipment
Technical Data Book	Free of charge	<p>The technical data book is for a person who designs hardware and software.</p> <p>It includes direct control methods for hardware, I/O map, and external specifications.</p>

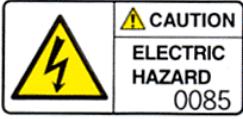
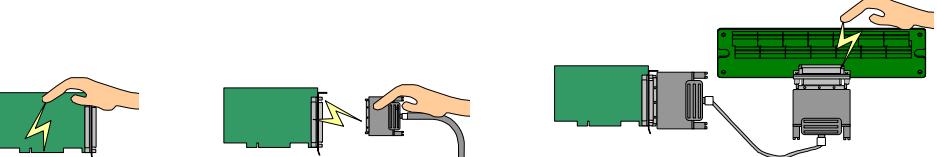
Note: You may download software drivers from our Web site free of charge. We also provide software drivers on CD-ROM for a nominal fee.

Handle with Care

⚠ Warning

	Please consult our Customer Support Center if you intend to use our products for special purposes, such as the use for moving vehicles, medical treatment, aerospace engineering, controlling nuclear power, submerged translators and so on. Refer to "Chapter 9 Information Service," page 20, for more details.
	Keep this product away from flammable gases.
	Do not modify the product. Interface Corporation assumes no liability for any malfunctions resulting from users' unauthorized modification of the product.

⚠ Caution

	Do not touch around the following label because of high temperature when using this product. Do not remove the label from the product. 
	Do not touch around the following label because electric shock may occur when using high-voltage (50 Vdc or greater) for an external circuit. Do not remove the label from the product. 
	Do not touch around the following label when using this product because there is a rotary part near here. Do not remove the label from the product. 
	<p>Discharge static electricity from your body by touching a grounded metal object before handling the product. The static electricity may damage the product.</p> <p>Care should be taken in the following situations.</p> <ul style="list-style-type: none"> - When touching this product. - When connecting a cable. - When wiring a terminal block. 

	Make sure the external cable connector is disconnected before installing or removing any boards. It may cause short-circuit with the boards in adjacent slots.
	To avoid possible injury or malfunction, do not touch the soldered surfaces of this product.
	Use this product only under the specified conditions such as power supply, voltage, temperature, and humidity range.
	This product is made under strict quality management, however, when using this product for the purposes that may result in any damages, lost profits, or any other incidental or consequential damages resulting from breakdown of this product, the user is required to take adequate and appropriate measures, such as installing safety devices to avoid possible serious accidents.
	Take measures to avoid and minimize shock, vibration, magnetic fields, and static electricity in the storage or operating environment of this product.
	<p>Avoid the following conditions for storage and operation.</p> <ul style="list-style-type: none"> • Extremely high temperature and humidity • Exposure to the direct rays of the sun • A lot of soot and dust • Vibrations and mechanical shocks • Chemical vapors <p>Keep this product away from foreign matter.</p>
	Do not forcibly bend the cable connected to each module.
	This product has a detection circuit for insertion into and removal from a PCI slot. This circuit allows this product to protect itself from incorrect operation such as inserting it into or removing it from the PCI slot while the power is on. We call this feature Safety Bus. The Safety Bus does not guarantee a successful Hot Swap.

Environmental Specifications

Use this product only under the conditions as shown below.

Environmental Conditions	Operating temperature: 0 degrees C to 50 degrees C Relative humidity: 20% to 90% (non-condensing)
Dust	Typical office environment
Corrosive Gas	None
Noise	Keep this product away from power source such as motors as far as possible to avoid electromagnetic interference.
Voltage Requirements	+5 Vdc (+/-5%): 0.1 A (typ.)
Bus Requirements	PCI local bus (Rev. 2.1 or later), 32 bits, 33 MHz 5 V or 3.3 V signaling environment For Low Profile PCI
Dimensions	119.91 (D) x 60 (H) (Low Profile PCI)
Number of Slots Required	1 slot

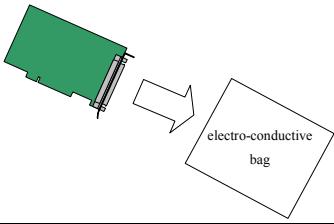
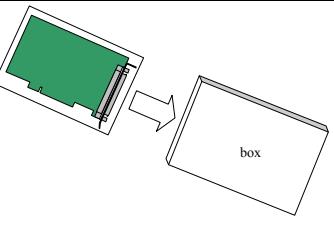
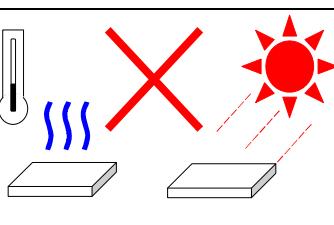
Periodic Inspections

The following inspections should be carried out on this product periodically.

Item	Checkpoint
Cable connections	Be sure that all connectors and cables are installed correctly.
Card edge	Check for dirt or corrosion.
Connector contacts	Check for dirt or corrosion.
Surfaces	Surface should be free of dust and foreign matter.

Storage

This product should be stored exactly the same way as when it was received. Proceed as follows:

	1. Put this product back in its electro-conductive bag.
	2. Wrap the product with the original packing material.
	3. Do not expose the product to the direct rays of the sun. Avoid excessive humidity. Store the product at room temperature.

The pictures are for reference purpose only.

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Chapter 1 Summary

The PCI-6103S, a timer product for Low Profile PCI-based computers, provides a 1-channel 32-bit timer. This product provides an interval timer and a 32-bit free-run counter, which are software selectable. The interval timer supports high-precision instrumentation by configuring its timer cycle in the range from 1 μ s to 16,777,215 μ s.

1.1 Features

>>High-precision interval timer

The product provides a high-precision interval timer. The interval timer cycle is configurable in the range from 1 μ s to 16,777,215 μ s.

>>Timer modes

The product supports two timer modes, repeat mode and one-shot mode. In the repeat mode, a periodic timer event occurs every time a specified period elapses. In the one-shot mode, a single timer event occurs once after a specified time elapses.

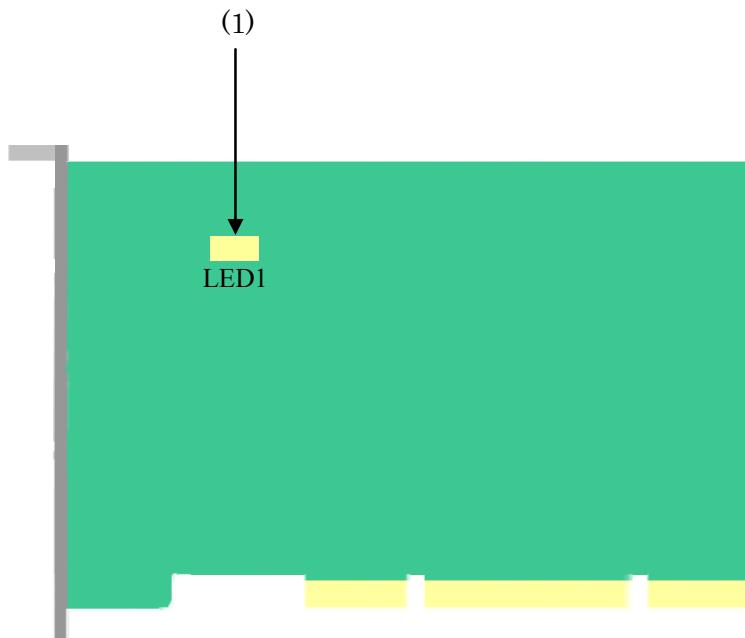
>>Free-run counter

In addition to the interval timer, the product provides a 32-bit free-run counter. You can read the counter values anytime you want.

>>The product is applicable only to a Low Profile PCI slot.

Chapter 2 Factory Default Settings

2.1 Factory Default Settings

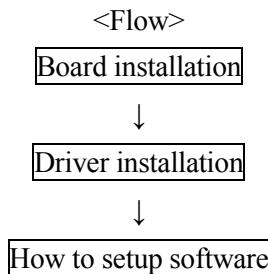


(1) Access LED (LED1)

The LED1 glows green to indicate the CPU accesses to this product. A single access lights the LED1 for 500 ms. When continual accesses cease, the LED1 turns off 500 ms later.

Chapter 3 Setup

This chapter explains about preparations for using this product.

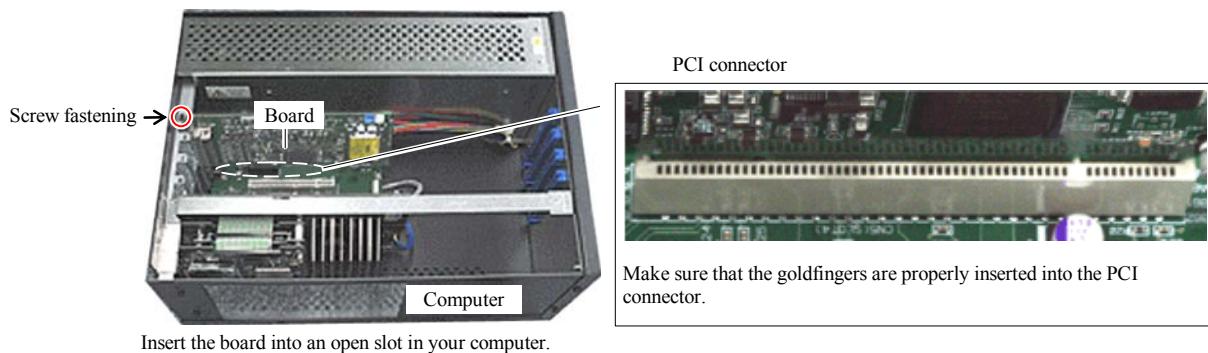


We recommend you to check the operation. Refer to “4.1.3 Uninstallation of Utility Disk,” page 15, and “Chapter 5 Uninstallation,” page 16, for uninstallation.

3.1 Board Installation

Note: The following pictures are for reference purpose only.

1. Make sure that the system is turned off, and unplug the power cable.
2. Remove the PC case cover and a slot cover.
3. Insert the board into an open slot.



Caution



Be careful of the insert direction to avoid system damage when you insert this product into your system.

4. Fasten the panel to the bracket with a screw.
5. Replace the cover, plug in the power cable, and turn on the computer.

Chapter 4 Software Installation

Information

	To operate this product, the driver software is required. To download the driver software free of charge, visit our Web site and get a user ID.
	Refer to Help in the software about how to use the DLL functions, sample programs, and utility programs.

4.1 Windows

The Interface device driver software is composed as follows.

- Driver disk

This disk contains the device drivers.

Downloading procedure

>> Download the Driver Disk of GPF-6103 for your operating system from our Web site.

>> Execute the downloaded program, and then a folder is created.

Note: Refer to “4.1.1 Installation of Device Driver Software,” page 10, for more details.

- Utility disk

This disk contains the Readme, Help, sample programs, utility programs, and so on.

Downloading procedure

>> Download the Utility Disk of GPF-6103 from our Web site.

>> Execute the downloaded program, and then [SETUP] folder is created.

>> Run the SETUP.EXE file on the [SETUP] folder. The programs will be installed to the drive you specify.

4.1.1 Installation of Device Driver Software

■ Windows Server 2008 or Windows Vista

The driver may only be installed by a member of the System Administrators group.

1. When you log on to Windows Server 2008 or Windows Vista, the device driver wizard will start automatically. If you are prompted for an administrator password or confirmation, select **Continue**.
2. The **Found New Hardware** dialog box will appear, select **Locate and install driver software (recommended)**.
3. Select **Don't search online**.
4. Click **I don't have the disc. Show me other options**.
5. Click **Browse my computer for driver software (advanced)**.
6. Click **Browse** and specify the Win2000 driver folder downloaded from our Web site, and then click **Next**.
7. Installation will start automatically.
8. Follow further instructions on your screen.

Note: For Windows Server 2008 Server Core, install the driver with the following command.

<Example>

[Win2000] driver folder is in C drive: pnputil -i -a c:\Win2000\xxxx.INF

■ Windows Embedded Standard, Windows XP Embedded, Windows XP, or Windows Server 2003

The driver may only be installed by a member of the System Administrators group.

1. When you log on to Windows Embedded Standard, Windows XP Embedded, Windows XP, or Windows Server 2003, the device driver wizard will start automatically.
2. The **Found New Hardware Wizard** dialog box will appear, select **Install from a list or specific location [Advanced]**, and then click **Next**.
3. Select **Search for the best driver in these locations**, and select **Include this location in the search:**. Then click **Next**.
4. Click **Browse** and specify the Win2000 driver folder downloaded from our Web site, and then click **Next**.
5. Installation will start automatically.
6. Follow further instructions on your screen.

Make sure that there are no conflicts in setting up the computer resources, such as I/O addresses and interrupt request levels. After installing the device driver software, the Found New Hardware Wizard dialog box will not appear as described above in procedure 2 when the computer is turned on. After the installation of device driver software is completed, install the utility disk.

- When importing the hardware information file for Windows Embedded Standard or Windows XP Embedded

>> How to download the driver

1. Download the Driver Disk of GPF-6103 for its operating system from our Web site.
2. Execute the downloaded program, and then [Win2000] folder is created.

>> How to install the driver

1. Start up the Component Database Manager of Windows Embedded Standard or Windows XP Embedded development environment.
2. Import the our hardware information file. Follow further instructions on your screen to import the file whose extension is SLD in the [Win2000] folder.

■ Windows 2000

The driver may only be installed by a member of the System Administrators group.

1. When you log on to Windows 2000, the device driver wizard will start automatically.
2. In the **Found New Hardware Wizard** dialog box, click **Next**.
3. Select **Search for a suitable driver for my device [recommended]**, and then click **Next**.
4. Select **Specify a location** check box, and then click **Next**.
5. Click **Browse** and specify the Win2000 driver folder downloaded from our Web site, and then click **OK**.
6. To install the driver Windows found, click **Next**.
7. Follow further instructions on your screen.

Make sure that there are no conflicts in setting up the computer resources, such as I/O addresses and interrupt request levels. After installing the device driver software, the Found New Hardware Wizard dialog box will not appear as described above in procedure 2 when the computer is turned on. After the installation of device driver software is completed, install the utility disk.

■ Windows NT 4.0

The driver may only be installed by a member of the System Administrators group.

1. Log on to Windows NT 4.0.
2. Right-click on the GPC6103.INF file in the WinNT driver folder downloaded from our Web site, and then click **Install** on the shortcut menu.
3. Follow further instructions on your screen.

Make sure that there are no conflicts in setting up the computer resources, such as I/O addresses and interrupt request levels. After the installation of device driver software is completed, install the utility disk.

■ Windows Millennium Edition

1. When you log on to Windows Millennium Edition, the device wizard will start automatically.
2. In the **Add New Hardware Wizard** dialog box, select **Specify the location of the driver (Advanced)**, and then click **Next**.
3. Select **Specify a location** check box, and then click **Browse** to locate the file.
4. Specify the Win95 driver folder downloaded from our Web site, and then click **Next**.
5. Follow further instructions on your screen.

Make sure that there are no conflicts in setting up the computer resources, such as I/O addresses and interrupt request levels. After installing the device driver software, the **Add New Hardware Wizard** dialog box will not appear as described above in procedure 2 when the computer is turned on. After the installation of device driver software is completed, install the utility disk.

■ Windows 98

1. When you log on to Windows 98, the device wizard will start automatically.
2. In the **Add New Hardware Wizard** dialog box, select **Search for the best driver for your device [Recommended]**, and then click **Next**.
3. Select **Specify a location** check box, and then click **Browse** to locate the file.
4. Specify the Win95 driver folder downloaded from our Web site, and then click **Next**.
5. Follow further instructions on your screen.

Make sure that there are no conflicts in setting up the computer resources, such as I/O addresses and interrupt request levels. After installing the device driver software, the **Found New Hardware Wizard** dialog box will not appear as described above in procedure 2 when the computer is turned on. After the installation of device driver software is completed, install the utility disk.

■ Windows 95

1. When you log on to Windows 95, the device driver wizard will start automatically.
2. **Update Device Driver Wizard** dialog box will appear, and then click **Next**.
3. Select **Search for the best driver for your device**, and then click **Next**.
4. If Windows does not find the adapter, select **Other Locations**, and then click **Browse**.
5. Specify the Win95 driver folder downloaded from our Web site, and then click **Finish**.
6. Follow further instructions on your screen.

Make sure that there are no conflicts in setting up the computer resources, such as I/O addresses and interrupt request levels. After the installation of device driver software is completed, install the utility disk.

4.1.2 Installation of Utility Disk

1. Decompress* the compression file downloaded from our Web site and run the SETUP.EXE file on the decompression folder. The README, Help, and sample programs will be installed to the drive you specify.
2. Follow further instructions on your screen.
3. To verify that you have successfully installed the software package, check that **GPF-6103** is registered in the **Interface** folder of the **Program Files** folder.

* Decompress procedure

- A. Create a directory with an appropriate name in a hard disk.
- B. Copy each downloaded file to the directory created in Procedure A.
- C. Run each file copied in Procedure B to decompress the file. Then a folder and file will be created.

4.1.3 Uninstallation of Utility Disk

- Windows Server 2008 or Windows Vista

1. Click the **Start** button and **Control Panel**.
2. Click the **Programs, Programs and Features**, and then **Uninstall or Change a program**.
3. Click **Interface GPF-6103** in the list, and then click **Uninstall**.
4. Follow further instructions on your screen.

- Windows Embedded Standard, Windows XP Embedded, Windows XP, or Windows Server 2003

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click **Add/Remove Programs**, and then click the **Change or Remove Programs** tab.
3. Click **Interface GPF-6103** in the list, and then click **Change/Remove**.
4. Follow further instructions on your screen.

- Windows 2000, Windows NT 4.0, Windows Me, Windows 98, or Windows 95

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click **Add/Remove Programs**, and then click the **Install/Uninstall** tab.
3. Click **Interface GPF-6103** in the list, and then click **Add/Remove**.
4. Follow further instructions on your screen.

Chapter 5 Uninstallation

5.1 Board Uninstallation

1. Make sure that your computer is turned off, and unplug the power cable from the AC outlet.
Remove the PC case cover.
2. Remove the screw from the board.
3. Remove the board from the slot gently.

Chapter 6 Hardware Description

6.1 Hardware Specifications

Basic Specifications

Parameter	Specification
Bus requirements	PCI local bus (Rev. 2.1 or later), 32 bits, 33 MHz 5 V or 3.3 V signaling environment For Low Profile PCI
Number of slots required	1 slot
Data transfer mode	I/O transfer (memory mapped I/O mode)
Number of I/O ports	16 ports (automatically assigned)
Dimensions	119.91 (D) x 60 (H) (Low Profile PCI)
Weight	45 g
Power consumption	+5 Vdc (+/-5%): 0.1 A (typ.)
Environmental conditions	Operating temperature: 0 degrees C to 50 degrees C Relative humidity: 20% to 90% (non-condensing)
Connectors	No connector
Isolation	No-isolation
Withstand voltage	-
Insulation resistance	-
Timer	Interval timer, free-run counter
Interrupt sources	Interval timer

Counter

Parameter	Specification
Interval timer	Input clock frequency
	Programmable timer cycle
	Timer mode
Free-run counter	Base clock frequency
	Counter bit length
	Counter mode
Internal base clock accuracy	+/-100 ppm

Chapter 7 Functional Description

7.1 Interrupt Sources

The PCI-6103S can generate interrupts to the computer. Interrupt requests are cleared under the following conditions:

- When the software reads the interrupt flag.
- When you change the interrupt mask setting.
- When you change the interval timer cycle.
- When the PCI bus is reset.
- When the computer is turned on.

7.1.1 Interval Timer

You can specify the interval timer cycle in the range from 1 μ s to 16,777,215 μ s. If you specify the interval timer cycle to 0, the timer stops. The interval timer stops counting under the following conditions:

- When the software issues a stop instruction.
- When the PCI bus is reset.
- When the computer is turned on.

■ Timer Modes

The PCI-6103S supports two timer modes, repeat mode and one-shot mode.

Repeat Mode	A periodic timer event occurs every time specified period elapses.
One-Shot Mode	A single timer event occurs once after a specified time elapses.

7.1.2 Free-Run Counter

The PCI-6103S provides a 32-bit free-run counter. You can select a 1 MHz (fixed) or an interval timer cycle as a base clock frequency. When 1 MHz (fixed) is specified, the free-run counter continuously increments its counter. When the interval timer cycle is specified, the free-run counter increments its counter in the interval timer cycle. The counter value can be read at anytime. You cannot stop the free-run counter.

The counter value is cleared under the following conditions:

- When the software issues a clear command.
- When the clock source is changed.
- When the counter is reset.



The base clock for GPF-6103 is fixed to 1 MHz.

Chapter 8 Optional Products

8.1 Accessories

Refer to our Web site for more details.

Software

Model	Description
GPF-6103	Windows Driver Software for Timer Counter Product

Chapter 9 Information Service

9.1 How to Get Information

We have a lot of valuable information on our Web site. Please visit our Web site and get your necessary information.

Japan: www.interface.co.jp

International: www.interface-world.com

To download user's manuals and device driver software, a registered user ID is required.

Technical Support	Frequently asked questions, white papers, glossary, and so on.
Product Information	What's new, specifications, product selection guides, and so on
Useful Information	Price information, rental information, distributors
Download Service	Drivers, technical documents like sample programs and user's manual data

Note: The design and contents of the Web site are under constant review. Therefore, there might be some changes in its design and contents.

Revision History

Version	Date	Comments
1.3	May, 2010	<p>Windows Server 2008, Windows Vista, Windows Embedded Standard, Windows XP Embedded, and Windows Server 2003 supported.</p> <p>Manual revised:</p> <ul style="list-style-type: none"> Manual title changed from PCI-6103, 6103S to PCI-6103S. Section 1.1 Packing List deleted. Section 1.2 Using This Manual deleted. Chapter 3 Setup changed. Chapter 4 Software Installation changed. Chapter 5 Software deleted. Chapter 6 Troubleshooting deleted. Section 6.1 Hardware Specifications <ul style="list-style-type: none"> Internal base clock accuracy: +/-100 ppm added. Chapter 7 Version Considerations deleted. Section 7.1.1 Interval Timer <ul style="list-style-type: none"> ■ Timer Mode added. Chapter 8 Optional Products added. Chapter 9 Information Service added. Chapter construction changed. Index deleted. Format revised.
1.2	April, 2003	Format revised.
1.1	February, 2003	<p>The PCI-6103S board supported.</p> <p>Windows XP supported.</p> <p>Hardware changed:</p> <ul style="list-style-type: none"> 5 V card edge connector replaced with universal card edge connector. Form factor of the PCI-6103 board changed. A bracket added. <p>Manual revised:</p> <ul style="list-style-type: none"> Manual title changed from PCI-6103 to PCI-6103, 6103S. Chapter 7 Version Considerations added. Index added.
1.0	July, 2001	First Release

Due to constant product improvements, the information in this USER'S MANUAL is subject to change without prior notice.

Indemnification

Interface Corporation makes no warranties regarding damages resulting from installation or use of this product, whether hardware or software, and the user assumes all risk.

Interface Corporation shall not be liable for any incidental or consequential damages, including damages or other costs resulting from defects which might be contained in the product, product supply delay or product failure, even if advised of the possibility thereof. Customer's right to recover damages caused by fault or negligence on the part of Interface Corporation shall be limited to product improvement or exchange.

Interface Corporation does not assume the responsibility for compensation.

This product including its software may be used only in Japan. Interface Corporation cannot be responsible for the use of this product outside Japan. Interface Corporation does not provide technical support service outside Japan.

Interface Corporation provides only the exchange maintenance service outside Japan. The technical support shall be limited to e-mail only.

Warranty

This product is warranted in accordance with our warranty provision. This warranty does not apply to the software products, accessories, and expendable supplies such as batteries.

Notes:

- You can determine the warranty period at our Web site by the serial number and part number of your product. Those without internet access should contact the Customer Support Center.
- Please refer to the insertion about repair, replace, and export of Interface products.

In principle, we do not charge for repair during the warranty period. (Customer is responsible for all shipping charges.)

The Warranty provided herein does not cover expendable supplies such as batteries and damages, defects, malfunctions, or failures caused by impact during transportation while under owner's responsibility; owner's failure to follow the instructions and the precautions contained in this manual; modification and/or repair of the product by other than Interface Corporation, trouble caused by use with peripherals not specified by Interface Corporation, power failure or surges, fire, earthquake, tidal wave and/or flood, and transit damage. This warranty is applied only when this product is used in Japan.

All repairs are accepted at your expense after the warranty period.

Repair is warranted only if the same components are broken within six months from the last repair. (Repair is limited to repairable components.) When you request repair, please make sure to attach the previous repair report. If the report is not attached, we treat the request as a new repair request.

Export

The foreign exchange and foreign trade law of Japan controls the export of this product, due to its possible use as a STRATEGIC MATERIAL. Therefore, before you export this product, you must secure an export permit from the government of Japan.

■ Repair and maintenance

We provide repair and maintenance service for your damaged product. If you need this service, please follow the procedures for repair and maintenance applications. You can also download a user's manual of Japanese version from our Web site below.

URL: www.interface.co.jp

■ For assistance

If you would like to inquire our products, please contact below.

Customer Support Center

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E-mail:

Japan: support@interface.co.jp

International: support@interface-world.com